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Rev 06/04/04

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Christopher J. Bulian	Docket No.:	S-100,500
Serial No.:	10/629,489	Examiner:	Paul A. Wartalowicz
Filed :	July 28, 2003	Art Unit:	1754
For :	PREPARATION OF TUNGSTEN OXIDE		

Mail Stop Appeal Brief - Patents
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

1. Transmitted herewith in triplicate is the Appeal Brief in this application with respect to the Notice of Appeal filed on January 23, 2007.

2. Attached is a Fee Transmittal Form.

Respectfully submitted,

Date: March 23, 2007

Samuel J. Borkowsky
Signature of Agent

Reg. No. 42,346
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CERTIFICATE OF MAILING/TRANSMISSION (37 CFR 1.8(a))

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Date March 23, 2007

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Samuel J. Borkowsky
Signature

Samuel L. Borkowsky
(type or print name of person certifying)

Rev. 02/02/06

FEE TRANSMITTAL
For FY 2006

Patent fees are subject to annual revision

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT: $250.00

Complete if Known	
Application Number:	10/629,489
Filing Date:	7/28/2003
First Named Inventor:	Christopher J. Bulian
Examiner Name:	Paul A. Wartalowicz
Group/Art Unit:	1754
Attorney Docket No.:	S-100,500

METHOD OF PAYMENT (check all that apply)

1. ☒ The commissioner is hereby authorized to charge indicated fees and credit any over payments to:
   Deposit Account Number: **12-2150**
   Deposit Account Name: **Los Alamos National Laboratory**
   ☒ Charge Any Additional Fee Required Under 37 C.F.R. 1.16 and 1.17

FEE CALCULATION

1. COMBINED FILING FEE

Large Entity Fee	Small Entity Fee	Fee Description	Fee Paid
1001 $300	2001 $150	Basic Filing fee	$0.00
1004 $300	2004 $150	Reissue Filing fee	$
1111 $500	2111 $250	Search Fee	$0.00
1311 $200	2311 $100	Examination Fee	$0.00
1005 $200	2005 $100	Provisional Filing Fee	
1085 $250	2085 $125	Provisional Size Fee	

(for each additional 50 sheets that exceeds 100 sheets)

SUBTOTAL (1) $0.00

2. EXTRA CLAIM FEES/APPLICATION SIZE FEE

		Extra Claims	Fee from Fee Paid Below
Total Claims	–20** =	X	= $0.00
Independent Claims	–3 ** =	X	= $0.00
Multiple Dependent		X 180	= $0.00

** *or number previously paid, if greater; For Reissues, see below*

Large Entity Fee	Small Entity Fee	Fee Description
1202 $50	2202 $25	Claims in excess of 20
1201 $200	2201 $100	Independent claims in excess of 3
1203 $360	2203 $180	Multiple dependent claim, if not paid.
1204 $200	2204 $100	Reissue independent claims in excess of 3 over original patent
1205 $50	2205 $25	Reissue claims in excess of 20 over original patent

Total Claims Fee $_____

APPLICATION SIZE FEE

1081 $250 2081 $125.00 For each additional 50 sheets that exceed 100 sheets, including specification and drawings

SUBTOTAL (2) $ 0.00
(Include total of Claims Fees and Size Fee here)

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	$130	2051	$65	Surcharge – late filing fee or oath	
1052	$50	2052	$25	Surcharge – late provisional filing fee or cover sheet	
1812	$2520	1812	$2520	For filing a request for reexamination	
1251	$120	2251	$60	Extension for reply within first month	
1252	$450	2252	$225	Extension for reply within second month	
1253	$1020	2253	$510	Extension for reply within third month	
1254	$1590	2254	$795	Extension for reply within fourth month	
1255	$2160	2255	$1080	Extension for reply within fifth month	
1401	$500	2401	$250	Notice of Appeal	
1402	$500	2402	$250	**Filing a brief in support of an appeal**	$250.00
1403	$1000	2403	$500	Request for oral hearing	
1452	$500	2452	$250	Petition to revive – unavoidable	
1814	$110	2814	$55	Terminal Disclaimer	
1453	$1500	2453	$750	Petition to revive – unintentional	
1460	$130	1460	$130	Petitions to the Director	
1806	$180	1806	$180	Submission of Information Disclosure Statement	
1809	$790	2809	$395	Filing a submission after final rejection (37 CFR 1.129 (a))	
1810	$790	2810	$395	For each additional invention to be examined (37 CFR 1.129(b))	
1811	$100	1811	$100	Certificate of Correction	
1504	$300	1504	$300	Publication fee for early, voluntary, or normal publication/Republication fee	
1801	$790	2801	$395	Request for Continued Examination (RCE)	

Other fee (specify) _____

SUBTOTAL (3) $250.00

Reduced by Basic Filing Fee Paid

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SUBTOTAL FROM 2 $ 0.00
SUBTOTAL FROM 3 $250.00

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(Enter total amount at top of page)

SUBMITTED BY			Complete (if applicable)	
Printed Name:	Samuel L. Borkowsky		Reg. No.	42,346
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellants:	Christopher J. Bulian et al.	Docket No.:	S-100,500
Serial No.:	10/629,489	Examiner:	Paul A. Wartalowicz
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APPEAL BRIEF

TABLE OF CONTENTS

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REAL PARTY IN INTEREST

Los Alamos National Security, LLC is the assignee of all right, title, and interest in and to U.S. Patent Application Serial No. 10/629,489 from the Government of the United States, United States Department of Energy.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Claims 1-10 are pending in the application. Claims 1-10 have been reviewed on the merits and finally rejected in the April 19, 2005 Office Action. Applicants appeal the rejection of claims 1-10.

STATUS OF AMENDMENTS

No post-final amendments have been filed.

SUMMARY OF CLAIMED SUBJECT MATTER

The claimed subject matter relates to four areas: (i) to a solution of ammonium paratungstate and hydrochloric acid, (ii) to a preparation of the solution, (iii) to methods involving using the solution to form tungsten oxide monohydrate and anhydrous tungsten oxide, and (iv) to particles of tungsten oxide monohydrate and anhydrous tungsten oxide having platelet morphology.

The following table provides a reference to specification locations that support the recited claim limitations. The claims are supported by following paragraphs:

Claim Limitation	Support Location
1. A solution comprising a combination of ammonium paratungstate and hydrochloric acid.	Page 5, lines 13-22.
2. A solution prepared by combining ammonium paratungstate with hydrochloric acid.	Page 5, lines 13-22.
3. The solution of claim 1 wherein said hydrochloric acid comprises an aqueous solution of about 35-38 weight percent of hydrochloric acid.	Page 5, lines 13-22.
4. A method for preparing $WO_3 \cdot H_20$ comprising preparing a precursor solution comprising a combination of ammonium paratungstate and hydrochloric acid and combining the precursor solution with water to form a precipitate, and isolating the precipitate.	Page 5, line 23 through Page 7, line 8. Page 8, line 3-13.
5. A method for preparing anhydrous WO_3 nanopowder comprising preparing a precursor solution comprising ammonium paratungstate and hydrochloric acid, combining the precursor solution with water to form a precipitate, isolating the precipitate, and heating the precipitate to form the anhydrous WO_3 nanopowder.	Page 7, line 8 through Page 8, line 2.
6. The method of claim 5, wherein the isolated precipitate is heated at a temperature of from about 200°C to about 400°C to form the WO_3 nanopowder.	Page 7, line 8 through Page 8, line 2.
7. A method for preparing WO_2 comprising	Page 8, line 15-29.

preparing a precursor solution comprising ammonium paratungstate and hydrochloric acid, combining the precursor solution with water to form a precipitate, isolating the precipitate, and heating the precipitate to form the anhydrous WO_3 nanopowder, and reacting the anhydrous WO_3 nanopowder with hydrogen gas to form WO_2.	
8. Tungsten trioxide hydrate ($WO_3 \cdot H_20$) nanosized particles prepared by combining water with a precursor solution comprising a combination of ammonium paratungstate and hydrochloric acid.	Page 5, line 23 through Page 7, line 8. Page 8, line 3-13.
9. Tungsten trioxide hydrate ($WO_3 \cdot H_20$) nanosized particles having a platelet morphology.	Page 5, line 23 through Page 7, line 8. Page 8, line 3-13. Page 9, line 4-8.
10. Tungsten trioxide (WO_3) nanosized particles having a platelet morphology.	Page 7, line 8 through Page 8, line 2. Page 9, line 4-8.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

(1) Whether claims 1-6 and 8-10 were properly rejected under 35 U.S.C. § 103(a) over Redanz (US 2,993,755) to in view of Baresel et al. (US 3,902,917)

(2) Whether claim 7 was properly rejected under 35 U.S.C. § 103(a) over Redanz (US 2,993,755) in view of Baresel (US 3,902,917) and Sato (US 3,452,106).

(3) Whether claim 10 was properly rejected under 35 U.S.C. § 102(b)/103(a) over Sherman (US Patent Application 2002/0005145).

ARGUMENT

1. Claim 1-6 rejection under 35 U.S.C. 103(a). Claims 1-6 were finally rejected under 35 U.S.C. § 103(a) over Redanz in view of Baresel. Appellants traverse the rejections because Redanz in view of Baresel does not teach or suggest all of the claim limitations.

Claims 1-6 concern three areas: (i) a solution of ammonium paratungstate and hydrochloric acid; (II) a method for preparing the solution; (iii) methods for preparing tungsten oxide monohydrate and anhydrous tungsten oxide (WO_3) using the solution.

Claim 1 is a solution of ammonium paratungstate and hydrochloric acid. Claims 2-3 are methods for preparing the solution. The solution is central to the claimed invention. The solution and method claims are based on Appellant's teaching that ammonium paratungstate dissolves in concentrated hydrochloric acid (HCl).

Although Baresel was not relied upon to teach this solution or its preparation, the Office Action argues that Appellant's claims to the solution and method are obvious over Redanz in view of Baresel. The Office Action further argues that a slurry is synonymous with a solution and thus the Redanz disclosure of a slurry of ammonium paratungstate and HCl renders the claims obvious because a slurry is "...a colloidal solution wherein particles are suspended in the liquid (water)...".

In support of these arguments, the Office Action discusses Redanz's EXAMPLE III. Specifically, the Office Action notes that Redanz adds a slurry of water and ammonium paratungstate to concentrated chemically pure hydrochloric acid, that Redanz agitates the slurry in a 4-liter beaker for 2 to 3 hours at 75-85°C, and that Redanz allows the slurry to stand for a 24-hour period to settle and cool. Because Redanz describes the product as "...the resulting *solution*...", the Office Action argues that Redanz discloses a solution comprising water, ammonium paratungstate, and concentrated hydrochloric acid...". The Office Action then states that slurry and solution are equivalents and "...for at least three reasons, slurry and solution will be treated as equivalent for purposes of examination...".

Appellant respectfully disagrees with the equivalence afforded by the Office Action to "solution" and "slurry". By definition, a solution is a homogeneous mixture having a single phase. Conversely, a slurry has both a liquid phase and a solid phase. Thus, a slurry cannot be a solution. Redanz distinguishes between slurries and solutions in EXAMPLE 1. EXAMPLE 1 teaches the preparation of tungstic oxide having a particle range of from 1.5-3 microns with an average size of 2.5 microns. In EXAMPLE 1, Redanz uses a solution of sodium tungstate as a starting material. This

solution of sodium tungstate is treated with HCl to produce tungstic acid (H_2WO_4), which is formed into a slurry. Ammonia gas is bubbled through the slurry to form a solution of ammonium tungstate. The solution is then treated with concentrated HCl, cooled, agitated, and solid crystals of ammonium paratungstate precipitate from the solution and are filtered. Redanz further mentions "...it has been found that a tendency will occasionally be shown to form a colloidal suspension..." (column 12, lin3 13-14). Redanz correctly uses the phrase "colloidal suspension", and not "colloidal solution" because a colloid has both a liquid phase and a solid phase whereas a solution does not.

Returning to EXAMPLE III, Redanz forms a slurry of ammonium paratungstate in water, and then combines this slurry with concentrated HCl to form another slurry. After heating at 75-85°C for 2-3 hours, the solids do not dissolve. Redanz cools the slurry for a 24-hour period, and only then did the solid part of the slurry settle. Redanz refers to the liquid part of the slurry as a solution and the solid part as a yellow cake of tungstic acid. Redanz decants the solution and leaves the yellow cake of tungstic acid. Redanz does not suggest that there is any ammonium paratungstate dissolved in the decanted solution.

The Office Action argues that claim 2 uses "comprising" type open language that does not exclude water for the purposes of examination. The Office Action similarly argues that Appellant's phrase "comprising preparing a precursor solution comprising ammonium paratungstate and hydrochloric acid" uses "comprising" type open language that does not exclude a solution or slurry and therefore teaches the invention as claimed. Appellant agrees that the preparation does include water because concentrated HCl is a solution of a solution of HCl in water, but the mere inclusion of water by way of using a concentrated HCl solution does not mean that Redanz teaches the claimed invention.

Claims 4-6 are method claims that include a preparation of the precursor solution of ammonium paratungstate. The precursor solution of claim 4 is combined with water to form a precipitate of tungsten oxide monohydrate. The precursor solution of claim 5 is combined with water to form a precipitate that is heated to form anhydrous tungstic

oxide (WO_3). Claim 6 depends from claim 5 and includes temperature limitations. Neither Redanz nor Baresel teaches or suggests the preparation of the precursor solution. Moreover, neither Redanz nor Baresel teaches or suggests a process for making tungsten oxide monohydrate ($WO_3 \cdot H_2O$). Further, neither Redanz nor Baresel teaches or suggests a process for making nanopowder. Thus, the 35 U.S.C. § 103(a) is improper.

2. Claim 7 rejection under 35 U.S.C. 103(a). Claim 7 was finally rejected under 35 U.S.C. § 103(a) over Redanz in view of Baresel and Sato. Appellants traverse the rejections because Redanz in view of Baresel and Sato does not teach or suggest all of the claim limitations.

Claim 7 is a method for preparing WO_2. A precursor solution of ammonium paratungstate and hydrochloric acid is prepared. The solution is combined with water to form a precipitate. The precipitate is heated to form anhydrous WO_3. The anhydrous WO_3 is reacted with hydrogen to form WO_2. The Office Action argues that Sato teaches a process for making an oxide of tungsten of lower valency than WO_3 using hydrogen. However, none of the cited references, alone or in combination, teach Appellant's method of making the claimed precursor solution of ammonium paratungstate and hydrochloric acid, of combining the precursor solution with water to form a precipitate. Thus, the 35 U.S.C. § 103(a) rejection is improper.

3. Claim 8 rejection under 35 U.S.C. 103(a). Claim 8 was finally rejected under 35 U.S.C. § 103(a) over Redanz in view of Baresel. Appellants traverse the rejections because Redanz in view of Baresel does not teach or suggest all of the claim limitations.

Claim 8 is a product claim for nanoparticles of tungsten oxide monohydrate ($WO_3 \cdot H_2O$). The Office Action argues that tungsten oxide monohydrate and tungstic acid (H_2WO_4) as the same material, but ignores the different physical properties and different chemical properties of each compound. Neither Redanz or Baresel, alone or in combination, teach or suggest a preparation of tungsten oxide monohydrate. Moreover,

neither Redanz nor Baresel, alone or in combination, teaches or suggests tungsten oxide monohydrate particles of any size. In fact, neither Redanz nor Baresel teaches nanoparticles.

Beginning in column 1, line 10, Redanz states that if metal powders are too fine, it is extremely difficult to form a compact that will withstand handling during further treatment. However, if the particle sizes are too large, desired reactions between the powdered metal or metal compounds and other substituents may not go to completion (column 1, line 10-23). Redanz then describes a common procedure for forming ammonium paratungstate (precipitation from ammonium tungstate using HCl). After calcinations, the procedure results in particle sizes in the range of from 7-20 microns (larger than nanosized). Redanz states that these particles are too large for many applications because a particle size of 1.0 to 5.0 (also larger than nanosized) is desirable.

The Office Action argues Baresel's use of the term "finely divided" in EXAMPLE 1 (column 4, lines 43-47) inherently teaches nanoparticles. The term finely divided is used to describe the physical texture of a tungsten trioxide (WO_3) product. The term does not indicate that the product includes nanoparticles. Baresel mentions particle size when referring to tungsten carbide that was produced by a reduction of the finely divided WO_3 (column 4, lines 58-67). Baresel states that the tungsten carbide had a particle size of less than 60 microns. Baresel's reduction procedure teaches the tungsten oxide precursor and tungsten carbide product are likely powders of similar size. Thus, Baresel considers powder having 60-micron sized particles to be finely divided. Baresel does not mention anything else about the particle size. Appellant notes that Redanz makes tungstic acid particles ranging in size from 1 micron to 5 microns (no nanoparticles). Baresel would also consider this tungstic acid powder as finely divided, even though it does not include nanoparticles. Thus, the 35 U.S.C. § 103(a) rejection is improper.

4. Claim 9 rejection under 35 U.S.C. 103(a). Claim 9 was finally rejected under 35 U.S.C. § 103(a) over Redanz in view of Baresel. Appellants traverse the

rejection because Redanz in view of Baresel does not teach or suggest all of the claim limitations.

Claim 9 is a product claim for nanoparticles of tungsten oxide monohydrate ($WO_3 \cdot H_2O$) having a platelet morphology. Appellant traverses the rejection of claim 9 for reasons similar to those for claim 8. The Office Action argues that tungsten oxide monohydrate and tungstic acid (H_2WO_4) as the same material but ignores the different physical properties and different chemical properties of each compound. Neither Redanz nor Baresel, alone or in combination, teach or suggest a preparation of tungsten oxide monohydrate. Moreover, neither Redanz nor Baresel, alone or in combination, teach tungsten oxide monohydrate particles of any size. Further, neither Redanz nor Baresel, either alone or in combination, teach or suggest tungsten oxide monohydrate nanoparticles having platelet morphology. Thus, the rejection under 35 U.S.C. § 103(a) is improper.

5. Claim 10 rejection under 35 U.S.C. § 103(a) over Redanz in view of Baresel. Claim 10 was finally rejected under 35 U.S.C. § 103(a) over Redanz in view of Baresel. Appellants traverse the rejection because Redanz in view of Baresel does not teach or suggest all of the claim limitations.

Claim 10 is a product claim for nanoparticles of tungsten oxide (WO_3) having a platelet morphology. Neither Redanz nor Baresel teaches or suggests a process for making nanopowder. Moreover, neither Redanz nor Baresel, either alone or in combination, teach or suggest tungsten oxide particles of any size having platelet morphology. Specifically, neither Redanz nor Baresel, either alone or in combination, teach or suggest tungsten oxide particles having platelet morphology. Thus, the rejection under 35 U.S.C. § 103(a) is improper.

6. Claim 10 rejection under 35 U.S.C. § 102(b)/103(a) over Sherman. Claim 10 was finally rejected under 35 U.S.C. § 102(b)/103(a) over Sherman. Appellants traverse the rejection because Sherman does not teach or suggest all of the claim limitations.

Claim 10 is a product claim for nanoparticles of tungsten oxide (WO_3) having a platelet morphology. The Office Action argues "...Sherman teaches photocatalyst particles having a size of 1 to 100 nanometers made of tungsten oxide having platelet morphology (paragraph 0206, lines 4-5; paragraph 0208, lines 1-3; paragraph 0209, lines 10-13). If Sherman does not inherently teach nanosized particles of tungsten oxide having platelet morphology, one of ordinary skill in the art would recognize that it would be obvious to produce nanosized particles of tungsten trioxide having a platelet morphology based on the desired properties of the end product and that the limited number of combinations from the lists (compounds and geometries) would point one of ordinary skill to the combination of tungsten trioxide having platelet morphology...".

Appellant respectfully disagrees that Sherman teaches photocatalyst particles that have tungsten oxide having platelet morphology, or that it would be obvious to produce these particles. Sherman provides a list of photocatalytic particles for coating the surfaces of core particles. The list of photocatalytic particles is only partially reflected in paragraph [0208] and many more additional compounds are listed in paragraph [0207]. Tungsten oxide is one of many. Sherman provides a list of shapes that include spheres, equiaxial, rod-like or platelet. Sherman mentions that preferably the shape is equiaxial or spherical. However, Sherman does not associate tungsten oxide with platelets. Sherman only states that the photocatalyst can include tungsten oxide and that platelets is among the cited shapes. Furthermore, Sherman does not provide enablement for platelet-shaped nanoparticles of tungsten oxide, nor does he provide any written description of how to make platelet shaped nanoparticle of tungsten oxide.

Appellant provides a written description and an enabling disclosure for preparing platelet shaped nanoparticles of tungsten oxide. Appellant points out that it is not typical for either an anhydrous material or the chemically hydrated material to have the same morphology. Only by obtaining images of the particles at high magnification could one skilled in the art determine the morphology. Here, unexpectedly, the morphology for the anhydrous tungsten oxide was the same platelet type morphology as the precursor tungsten oxide monohydrate. Thus the 35 U.S.C. § 102(b)/103(a) rejection is improper.

In summary, Appellant submits claims 1-10 are allowable and urges that the rejections of claims 1-10 be reversed.

Respectfully submitted,

Date: March 23, 2007

Signature of Agent

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CLAIMS ON APPEAL APPENDIX

1. A solution comprising a combination of ammonium paratungstate and hydrochloric acid.

2. A solution prepared by combining ammonium paratungstate with hydrochloric acid.

3. The solution of claim 1 wherein said hydrochloric acid comprises an aqueous solution of about 35-38 weight percent of hydrochloric acid.

4. A method for preparing $WO_3 \cdot H_20$ comprising preparing a precursor solution comprising a combination of ammonium paratungstate and hydrochloric acid and combining the precursor solution with water to form a precipitate, and isolating the precipitate.

5. A method for preparing anhydrous WO_3 nanopowder comprising preparing a precursor solution comprising ammonium paratungstate and hydrochloric acid, combining the precursor solution with water to form a precipitate, isolating the precipitate, and heating the precipitate to form the anhydrous WO_3 nanopowder.

6. The method of claim 5, wherein the isolated precipitate is heated at a temperature of from about 200°C to about 400°C to form the WO_3 nanopowder.

7. A method for preparing WO_2 comprising preparing a precursor solution comprising ammonium paratungstate and hydrochloric acid, combining the precursor solution with water to form a precipitate, isolating the precipitate, and heating the precipitate to form the anhydrous WO_3 nanopowder, and reacting the anhydrous WO_3 nanopowder with hydrogen gas to form WO_2.

8. Tungsten trioxide hydrate ($WO_3 \cdot H_20$) nanosized particles prepared by combining water with a precursor solution comprising a combination of ammonium paratungstate and hydrochloric acid.

9. Tungsten trioxide hydrate ($WO_3 \cdot H_20$) nanosized particles having a platelet morphology.

10. Tungsten trioxide (WO_3) nanosized particles having a platelet morphology.

CLAIM COMPARISON WITH REJECTION APPENDIX

Claim limitation	Office Action's comment	Reference citation	Appellant's comment
1. A solution comprising a combination of ammonium paratungstate and hydrochloric acid.	Appellant's solution is obvious over Redanz. Redanz teaches Appellant's claimed solution because Redanz teaches a slurry of ammonium paratungstate and hydrochloric acid, and according to the Office Action, the term slurry is treated as a solution for the purposes of examination. The Office Action calls a slurry a "colloidal solution". Baresel was not relied upon for teaching a solution of ammonium paratungstate and hydrochloric acid.	The Office Action cites parts of EXAMPLE III in Redanz. The Office Action has not cited any references where a slurry is a solution.	Appellant's solution is not obvious over Redanz and Baresel. Redanz does not teach a solution of ammonium paratungstate and hydrochloric acid. A solution is a homogeneous mixture having a single phase. A slurry cannot be a solution because a slurry has a solid phase and a liquid phase. Redanz distinguishes between a solution and a slurry in EXAMPLE 1. Redanz also uses the term "colloidal suspension", not colloidal solution.
2. A solution prepared by combining ammonium paratungstate with hydrochloric acid.	Appellant's solution is obvious over Redanz. Redanz teaches Appellant's method because Redanz teaches preparing a slurry of ammonium paratungstate and hydrochloric acid and, according to the Office Action, a slurry is a solution for purposes of examination. Baresel was not relied upon for teaching a solution of ammonium paratungstate and hydrochloric acid.	The Office Action cites parts of EXAMPLE III in Redanz. The Office Action has not cited any references where a slurry is a solution.	Appellant's solution is not obvious over Redanz and Baresel. Redanz does not teach a solution of ammonium paratungstate and hydrochloric acid. A solution is a homogeneous mixture having a single phase. A slurry cannot be a solution because a slurry has a solid phase and a liquid phase. Redanz distinguishes between a solution and a slurry in EXAMPLE 1. Redanz also uses the term "colloidal suspension", not colloidal solution.
3. The solution of claim 1 wherein said hydrochloric acid comprises an aqueous solution of about 35-	Appellant's solution is obvious over Redanz in view of Baresel. Redanz teaches Appellant's	The Office Action cites Redanz and Baresel. The Office Action has not cited	Appellant's solution is not obvious over Redanz and Baresel. Redanz does not teach a solution

38 weight percent of hydrochloric acid.	method because Redanz teaches preparing a slurry of ammonium paratungstate and hydrochloric acid and, according to the Office Action, a slurry is a solution for purposes of examination. Redanz fails to teach wherein HCl comprises an aqueous solution of about 35-38 weight percent HCl. Barasel teaches a process for making finely divided WO_3 (finely divided inherently teaches nanopowder, col. 4, lines 45-48) wherein ammonium tungstate is mixed with concentrated HCl (37% by weight, col. 4, lines 30-33) for forming tungstic acid hydrate (col. 4, lines 40-43).	any references where a slurry is a solution.	of ammonium paratungstate and hydrochloric acid. Redanz in combination with Barasel do not teach the preparation of a solution by combining ammonium paratungstate with an aqueous solution of about 35-38 weight percent of hydrochloric acid. The use of concentrated HCl prevents the formation of a slurry.
4. A method for preparing $WO_3 \cdot H_20$ comprising preparing a precursor solution comprising a combination of ammonium paratungstate and hydrochloric acid and combining the precursor solution with water to form a precipitate, and isolating the precipitate.	Appellant's method is obvious over Redanz in view of Baresel. Redanz teaches preparing a slurry of ammonium paratungstate and hydrochloric acid and, according to the Office Action, a slurry is a solution for purposes of examination. Redanz uses the slurry to make tungstic acid. Tungstic acid is similar to tungsten oxide monohydrate.	The Office Action cites Redanz and Baresel. The Office Action has not cited any references where a slurry is a solution.	Appellant's method is not obvious over Redanz and Baresel. Appellant's method involves the preparation of solution, and then combining the solution with water to form a precipitate. None of the cited references alone or in combination teach or suggest Appellant's precursor solution of ammonium paratungstate and HCl. None of the cited references teach tungsten oxide monohydrate. Tungsten oxide monohydrate is not tungstic acid. These are different chemicals with different chemical and physical properties.
5. A method for preparing anhydrous WO_3 nanopowder comprising preparing a precursor solution comprising ammonium	Appellant's method is obvious over Redanz in view of Baresel. Redanz teaches preparing a slurry of ammonium paratungstate and	The Office Action cites Redanz and Baresel. The Office Action has not cited any references where a slurry is a	Appellant's method is not obvious over Redanz and Baresel. Appellant's method involves the preparation of solution, and then

paratungstate and hydrochloric acid, combining the precursor solution with water to form a precipitate, isolating the precipitate, and heating the precipitate to form the anhydrous WO_3 nanopowder.	hydrochloric acid and, according to the Office Action, a slurry is a solution for purposes of examination. Baresel makes finely divided WO_3. Finely divided inherently teaches nanopowder.	solution.	combining the solution with water to form a precipitate, then isolating the precipitate, and then heating the precipitate. None of the cited references teach or suggest how to form Appellant's precursor solution of ammonium paratungstate and HCl. Finely divided does not inherently mean nanoparticles. Neither Redanz nor Baresel disclose nanoparticles.
6. The method of claim 5, wherein the isolated precipitate is heated at a temperature of from about 200°C to about 400°C to form the WO_3 nanopowder.	Appellant's method is obvious over Redanz and Baresel. Baresel discloses heating tungstic acid to a temperature of 200C to form tungsten trioxide.	Redanz and Baresel.	Appellant's method is not obvious over Redanz and Baresel. Appellant's method involves the preparation of solution, and then combining the solution with water to form a precipitate, then isolating the precipitate, and then heating the precipitate. None of the cited references teach or suggest how to form Appellant's precursor solution of ammonium paratungstate and HCl. Finely divided does not inherently mean nanoparticles. Neither Redanz nor Baresel disclose nanoparticles.
7. A method for preparing WO_2 comprising preparing a precursor solution comprising ammonium paratungstate and hydrochloric acid, combining the precursor solution with water to form a precipitate, isolating the precipitate, and heating the precipitate to form the anhydrous WO_3 nanopowder, and reacting the anhydrous WO_3 nanopowder with hydrogen gas to form WO_2.	Appellant's method is obvious over Redanz, Baresel, and Sato. Sato is relied on for disclosing reducing WO_3 to a lower valency tungsten oxide.	Redanz, Baresel, Sato.	Appellant's method is not obvious over Redanz, Baresel, and Sato. Appellant's method involves the preparation of solution, and then combining the solution with water to form a precipitate, then isolating the precipitate, and then heating the precipitate to form anhydrous WO_3, then reacting the anhydrous WO_3 with hydrogen gas to form WO_2. None of the cited references teach

			or suggest how to form Appellant's precursor solution of ammonium paratungstate and HCl. Finely divided does not inherently mean nanoparticles. Neither Redanz nor Baresel disclose nanoparticles.
8. Tungsten trioxide hydrate ($WO_3 \cdot H_20$) nanosized particles prepared by combining water with a precursor solution comprising a combination of ammonium paratungstate and hydrochloric acid.	Appellant's claim is obvious over Redanz and Baresel. Tungsten oxide monohydrate and tungstic acid are similar. The method for producing tungstic acid is similar to Appellant's method for producing the tungsten oxide monohydrate because Redanz' slurry is considered equivalent to Appellant's precursor solution.	Redanz and Baresel.	Appellant's claim is not obvious over Redanz and Baresel. None of the cited references teach tungsten oxide monohydrate. Tungsten oxide monohydrate is not tungstic acid. These are different chemicals with different chemical and physical properties. Appellant's precursor solution is not a slurry. Differences in the products (tungstic acid versus tungsten oxide monohydrate) may be due to differences in starting material (a slurry versus a solution).
9. Tungsten trioxide hydrate ($WO_3 \cdot H_20$) nanosized particles having a platelet morphology.	Appellant's claim is obvious over Redanz and Baresel. Tungsten oxide monohydrate and tungstic acid are similar. Finely divided inherently teaches nanopowder. Redanz and Baresel inherently teach platelets.	Redanz and Baresel.	Appellant's claim is not obvious over Redanz and Baresel. Tungsten oxide monohydrate is not tungstic acid. These are different chemicals with different chemical and physical properties. None of the cited references teach nanoparticles. None of the cited references teach platelets. None of the cited references teach or suggest nanoparticle platelets of tungsten oxide monohydrate, or how to make them.
10. Tungsten trioxide (WO_3) nanosized particles having a platelet morphology.	Claim 10 is anticipated and/or obvious in view of Sherman. Sherman provides a list of materials that include WO_3, and a list of shapes that include	Sherman. Redanz and Baresel.	Appellant's claim not anticipated by Sherman. Appellant's claim is not obvious over Sherman. Sherman's lists do not teach tungsten trioxide nanosized

	platelets. If Sherman does not anticipate the claim, then Sherman renders the claim obvious. Claim 10 is also obvious over Redanz in view of Baresel.		platelets. Sherman does not correlate tungsten oxide with platelets. Sherman does not provide enablement or a written description of how to make them, either directly in the disclosure or by incorporation by reference of a paper of patent with a preparation. Redanz and Baresel in combination do not teach nanopowder, do not teach platelets, do not teach nanoparticles of tungsten trioxide having a platelet morphology

EVIDENCE APPENDIX

U.S. Patent 2,993,755

U.S. PATENT 3,902,917

U.S. PATENT 3,452,106

U.S. Patent Application 2002/0005145

RELATED PROCEEDINGS APPENDIX

None.